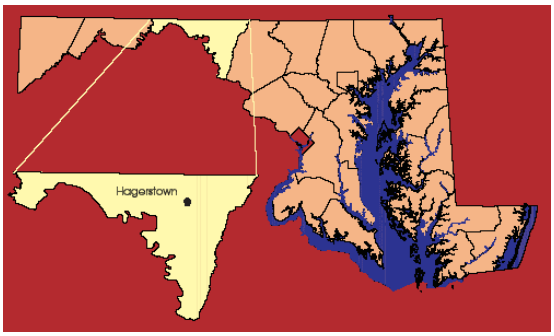
8.24 WASHINGTON COUNTY

This chapter presents information about stream conditions of potential management interest in Washington County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001v.



8.24.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of Washington County streams during 2000-2004 was Poor (Figure 8-195). The FIBI results indicate that 20% of the streams in the county were in Good condition, and only about 9% rated Good using the BIBI. In contrast, 61% of the streams in the county scored as Poor or Very Poor using the CBI, while only 2% scored as Good and 36% scored as Fair.

The highest concentration of sites with Good IBI scores was in the central part of the county. In contrast, there were many sites with Very Poor IBI scores in the Antietam Creek watershed. The highest rated stream in Washington County using the Combined Biotic Index (CBI) was an unnamed tributary to Little Beaver Creek, while the lowest rated streams included unnamed tributaries to Antietam Creek and the Potomac River, as well as the mainstem of Munson Spring Branch (Table 8-47). Based on Stream Waders data, sites rated as Poor or Very Poor for benthic macroinvertebrates in the county were outnumbered by sites rated Good or Fair in the Sideling Hill, Licking Creek, and Little Conococheague watersheds (Table 8-48). In the other watersheds in the county, the reverse was true.

8.24.2 Physical Habitat

8.24.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), 28% of the streams in Washington County had Minimally Degraded physical habitat (Figure 8-196). In contrast, 35% had Partially Degraded habitat and 37% had Degraded or Severely Degraded habitat. Sites with Minimally Degraded habitat were primarily located along both the eastern and western borders as well as in the north central portion of the county.

8.24.2.2 Trash

Over 71% of the stream miles in Washington County were rated Optimal for trash (Figure 8-197). In contrast, 8% of streams were rated as Marginal or Poor for trash. Sites with higher levels of trash were scattered throughout the county, except on public lands.

8.24.2.3 Channelization

About 13% of the stream miles in Washington County were channelized to some extent (Table 8-4). The types of channelization found at MBSS sites were concrete channels, culvert pipes, rip-rap, and earthen ditches (Figure 8-198). No geographic pattern in channelization was evident.

8.24.2.4 Inadequate Riparian Buffer

An estimated 20% of the stream miles in Washington County had no riparian buffers during the 2000-2004 MBSS (Table 8-3). In addition, 14% of stream miles had severe breaks in existing riparian buffers. The few sites that had inadequate riparian buffer zones in the county were generally found in the center of the county (Figure 8-199). In contrast, severe breaks in the riparian buffer zone were apparent in many locations throughout the county, with the exception of sites in Sideling Hill Creek. Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http:www/dnr/Maryland.gov/streams/pubs/ea05-7_ riparian.pdf).

8.24.2.5 Eroded Banks/Bedload Movement

Nearly 77% of the stream miles in Washington County were rated as having minimal (Optimal) bank erosion problems (Figure 8-200). In contrast, only 2% of stream miles were rated Poor for bank erosion, and an additional 9% were rated Marginal. There was no clear geographic trend, however there appeared to be more sites with at least minor bank erosion in the western portion of the county.

Almost 73% of the stream miles in Washington County had minor bar formation or were devoid of bars (Figure 8-200). An additional 20% were rated as having moderate

bar formation, and 7% of streams had extensive bar formation. In general, bar formation was more pronounced in the western part of the county, with some problems also apparent in a few of the smaller tributaries to the Potomac River.

8.24.3 Key Nutrients

8.24.3.1 Nitrate-Nitrogen

About 59% of the stream miles in Washington County had nitrate-nitrogen levels elevated over 1 mg/l (Figure 8-201). Nearly 13% of stream miles had nitrate-nitrogen values above the 5 mg/l threshold at which biological impacts have been documented. Few sites in the western and central parts of the county had elevated nitrate-nitrogen levels. In contrast, a number of sites in the eastern portion of Washington County had nitrate-nitrogen levels above 5 mg/l.

8.24.3.2 Total Phosphorus

Over 56% of the stream miles in Washington County had total phosphorus levels above the range found for mostly forested streams in Maryland (Figure 8-202). Of the remaining 44% of stream miles, 13% had total phosphorus levels above the threshold associated with biological effects. In general, total phosphorus levels were considerably more elevated in the eastern portion of the county.

8.24.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http:www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

Of the six watersheds found in Washington County, Potomac River Washington County/Marsh Run/Tonoloway Creek/Little Tonoloway Creek, Potomac River Allegany County/Sideling Hill Creek, Antietam Creek, and Little Conococheague Creek/Licking Creek were classified as Tier 1, meaning that these watersheds serve as strongholds for one or more state listed aquatic species (Figure 8-203). In contrast, the Potomac River Frederick County watershed was among the lower ranking for stream and river biodiversity in the state (82nd of 84). Any reaches that had either state-listed or GCN species, or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.24.5 Stressors

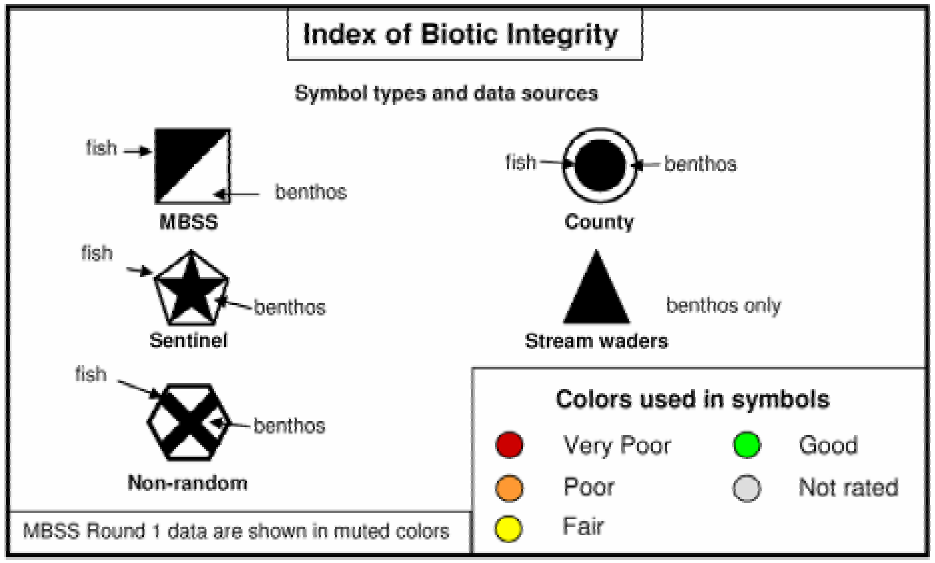
At 93% of stream miles, the most extensive stressor characterized by the MBSS in Washington County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found were: streams with non-native aquatic fauna (66% of stream miles); streams with >5% urban land use upstream (21% of stream miles); streams with no riparian buffer (20% of stream miles); acid deposition (20% of stream miles); high nitrate-nitrogen (13%),;eroded banks (14% of stream miles); and channelized streams (1%).

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

Key to MBSS 2000-2004 County Maps



Tier 1: Stronghold watershed (most robust remaining population) for one or more state-listed fish, aquatic herpetofauna, or freshwater mussels.

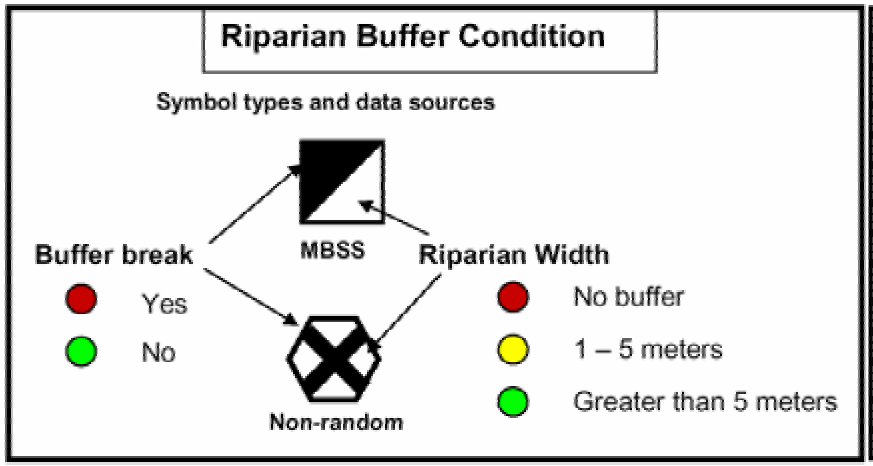
Tier 2: Stronghold watershed for one or more non-state listed species of greatest conservation need (GCN) fish, aquatic herpetofauna, or freshwater mussels, that also had state-listed fish, aquatic herpetofauna, or freshwater mussels present.

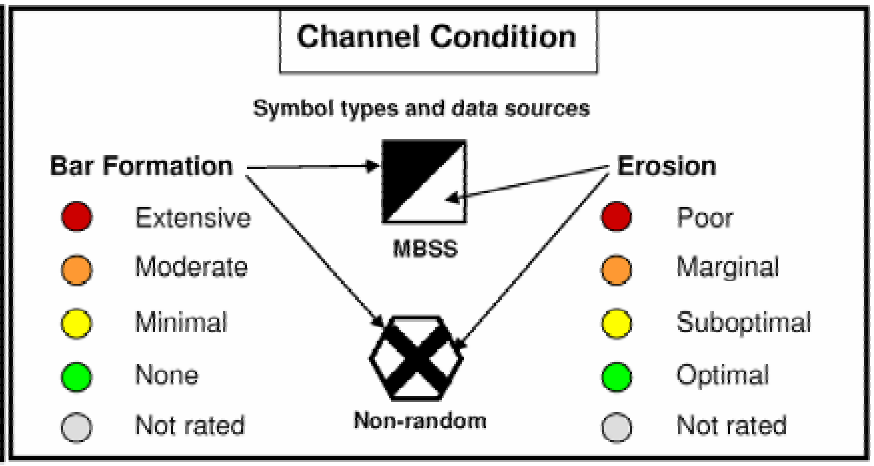
Tier 3: Stronghold watershed for one or more non-state listed GCN fish, aquatic herpetofauna, or freshwater mussels, no state-listed fish, aquatic herpetofauna, or freshwater mussels present.

Tier 4: Non-stronghold watershed with one or more state-listed fish, aquatic herpetofauna, or freshwater mussels present.

Tier 5: Not of the above, but a biodiversity conservation watershed. In other words, part of the network of watersheds that must be conserved to keep all native fishes, aquatic herpetofauna, freshwater mussels, and rare, pollution sensitive benthic macroinvertebrates extant in Maryland.

Tier 6: Not of the above.





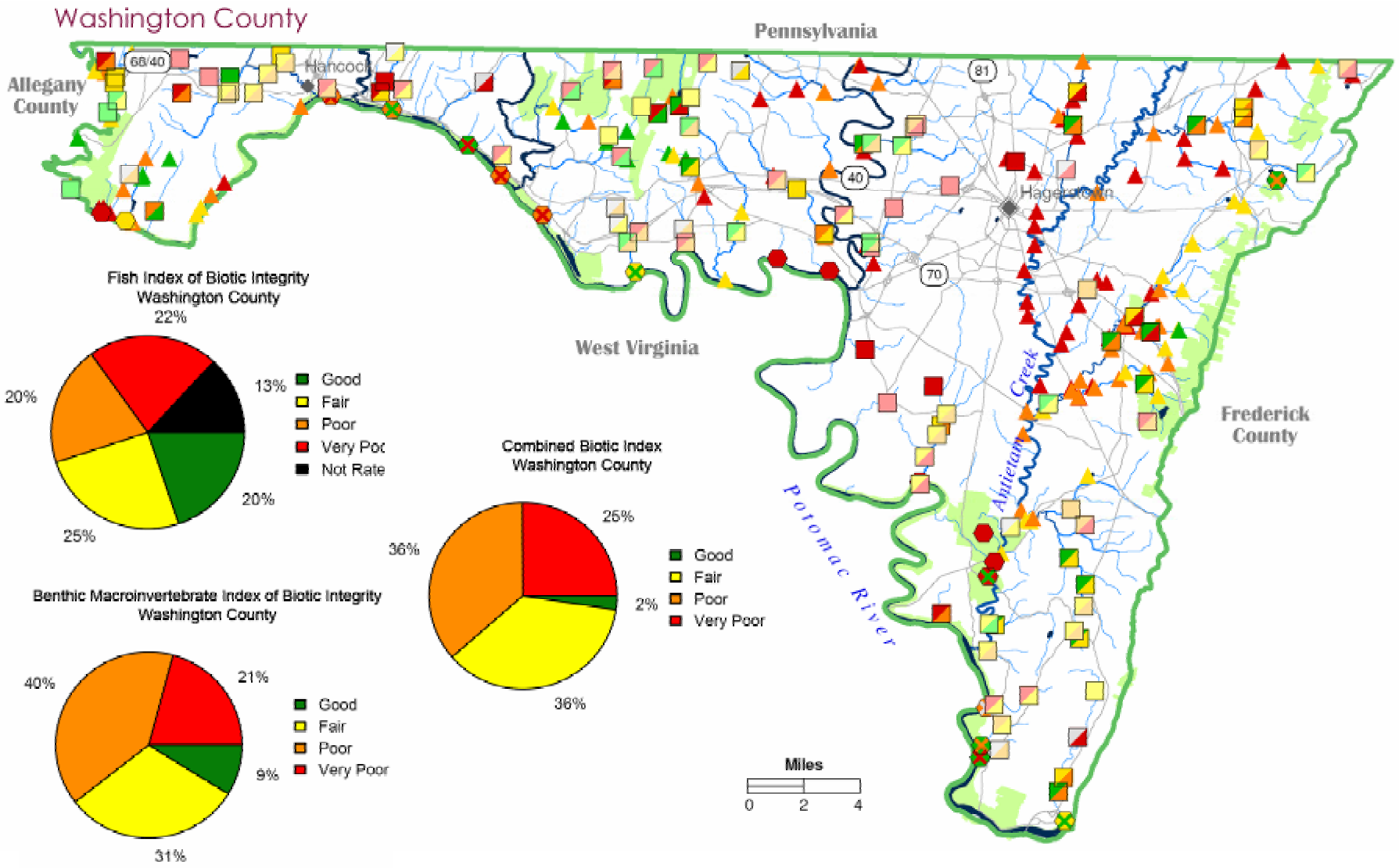


Figure 8-195. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Washington County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-47. MBSS sites sampled in Washington County during 1994- 2004, ranked by Combined Biotic Index Score (CBI)

Washington County - MBSS Sites

SITE NUMBER	STREAM NAME	WATERSHED	CBI
Best (in order of CBI score)			
WA-V-161-214-95	Little Beaver Creek UT	Antietam Creek	4.21
WA-A-003-308-95	Little Tonoloway Creek	Little Tonoloway Creek	4.17
WA-V-084-116-95	Little Antietam Creek UT	Antietam Creek	4.08
WA-V-105-215-95	Little Beaver Creek	Antietam Creek	4.00
SIDE-410-R-2001	Sideling Hill Creek	Sideling Hill Creek	4.00
WA-V-120-233-95	Sharmans Branch	Antietam Creek	3.96
LCON-209-R-2004	Little Conococheague Creek	Little Conococheague Creek	3.96
SIDE-405-R-2001	Sideling Hill Creek	Sideling Hill Creek	3.96
WA-V-148-305-95	Little Antietam Creek	Antietam Creek	3.88
WA-V-186-210-95	Little Antietam Creek	Antietam Creek	3.83
NCRW-206-N-2004	Green Spring Run	Potomac River	3.83
ANTI-208-R-2003	Sharmans Branch	Antietam Creek	3.83
WA-V-170-217-95	Toms Run	Little Conococheague Creek	3.79
ANTI-113-R-2003	Little Antietam Creek	Antietam Creek	3.75
LIKG-103-R-2004	Lanes Run	Licking Creek	3.71
NCRW-107-N-2004	Israel Creek	Potomac River	3.63
COCA-201-N-2003	Potomac River UT	Potomac River	3.58
WA-A-144-311-95	Bear Creek	Sideling Hill Creek	3.58
LCON-119-R-2004	Little Conococheague Creek UT2	Little Conococheague Creek	3.54
WA-A-139-235-95	Little Tonoloway Creek UT	Little Tonoloway Creek	3.54
PRWA-206-R-2002	Green Spring Run	Potomac River	3.54
ANTI-310-R-2003	Beaver Creek	Antietam Creek	3.50
WA-V-006-222-95	Little Antietam Creek	Antietam Creek	3.50
CONO-222-R-2002	Troupe Run	Conococheague Creek	3.50
WA-A-089-312-95	Bear Creek	Sideling Hill Creek	3.46

SITE NUMBER	STREAM NAME	WATERSHED	CBI
Worst (most degraded sites first)			
ANTM-101-N-2004	Antietam Creek UT1	Antietam Creek	1.00
COCA-115-N-2003	Potomac River UT	Potomac River	1.00
LTON-114-R-2000	Munson Spring Branch	Little Tonoloway Creek	1.13
ANTM-112-N-2004	Antietam Creek UT2	Antietam Creek	1.25
CONO-101-R-2002	Conococheague Creek UT2	Conococheague Creek	1.25
CONO-105-R-2002	Conococheague Creek UT2	Conococheague Creek	1.25
WA-V-193-110-95	Potomac River UT	Potomac River	1.25
WA-V-192-115-95	Hamilton Run	Antietam Creek	1.33
LTON-113-R-2002	Sawmill Hollow	Little Tonoloway Creek	1.38
WA-A-101-219-95	Ditch Run	Potomac River	1.38
COCA-104-N-2003	Potomac River UT	Potomac River	1.38
PRWA-106-R-2000	Downey Branch	Potomac River	1.38
COCA-119-N-2004	Potomac River UT14	Potomac River	1.42
ANTI-130-R-2003	Little Barber Creek UT	Antietam Creek	1.50
CONO-218-R-2002	Meadow Branch	Conococheague Creek	1.50
LIKG-116-R-2004	Rabble Run	Licking Creek	1.50
COCA-121-N-2004	Potomac River UT12	Potomac River	1.50
WA-V-003-123-95	St. James Run UT	Marsh Run	1.58
CONO-107-R-2002	Troupe Run	Conococheague Creek	1.63
WA-A-040-221-95	Rabble Run	Licking Creek	1.63
ANTI-107-R-2003	Falls Creek	Antietam Creek	1.75
WA-A-045-127-95	Tonoloway Creek UT	Little Tonoloway Creek	1.75
ANTI-111-R-2003	Dog Creek UT1	Antietam Creek	1.75
CONO-110-R-2002	Troupe Run	Conococheague Creek	1.75
			1.75

Table 8-48. Stream Waders sites sampled in Washington County during 2000-2004, ranked by Family-level Benthic Index of Biotic Integrity

Washington County - Stream Wader Sites				
WATERSHED	# GOOD	# FAIR	# POOR	# VERY POOR
Antietam Creek	1	19	25	33
Conococheague Creek	0	1	7	8
Licking Creek	4	1	1	0
Little Conococheague	2	4	3	1
Marsh Run	0	0	2	5
Potomac River	3	3	5	4
Sideling Hill Creek	5	5	1	1

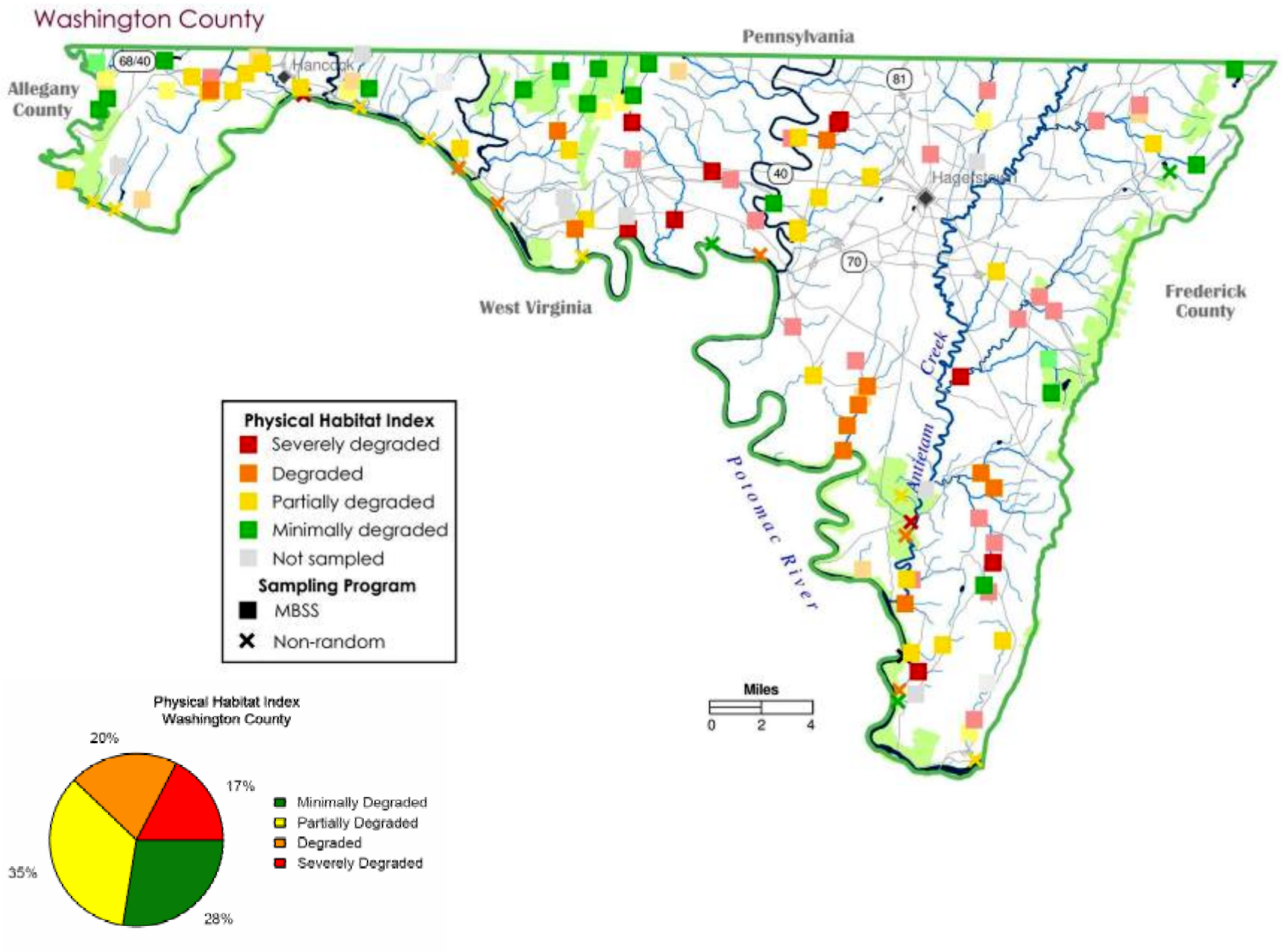


Figure 8-196. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Washington County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

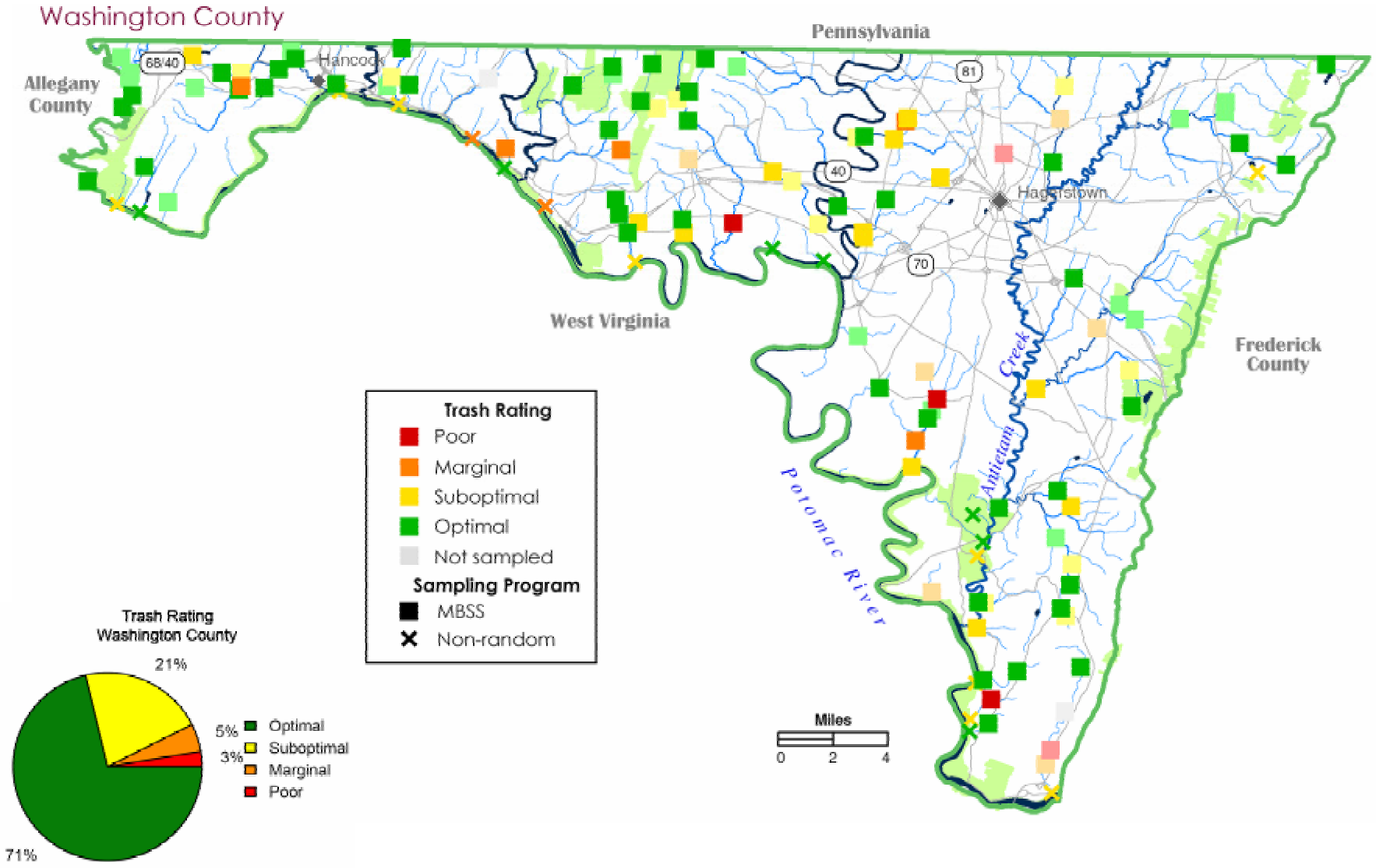


Figure 8-197. Pie chart and map of trash rating (0-20 scale) for Washington County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

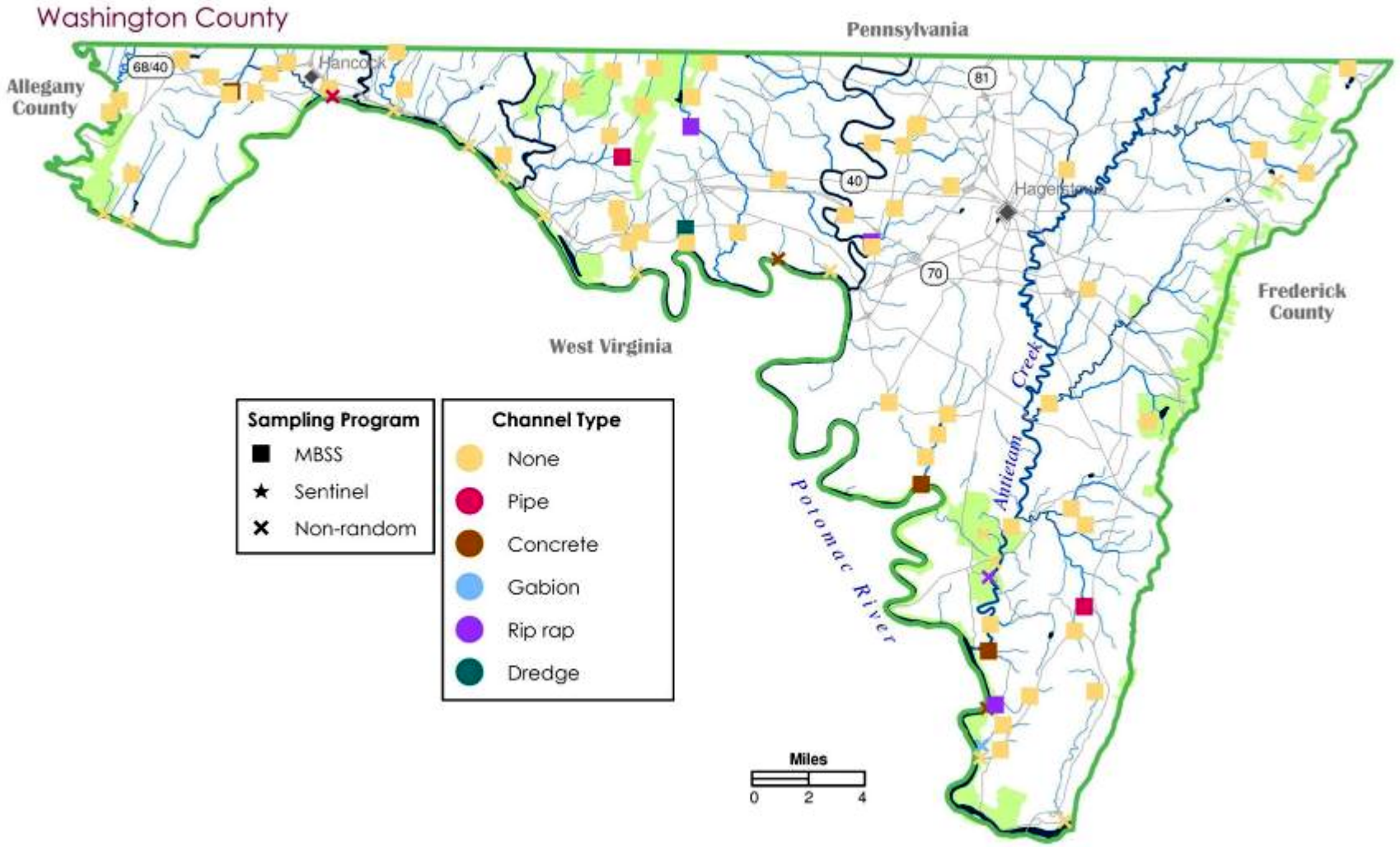


Figure 8-198. Map of channelized sites, by type, for Washington County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*

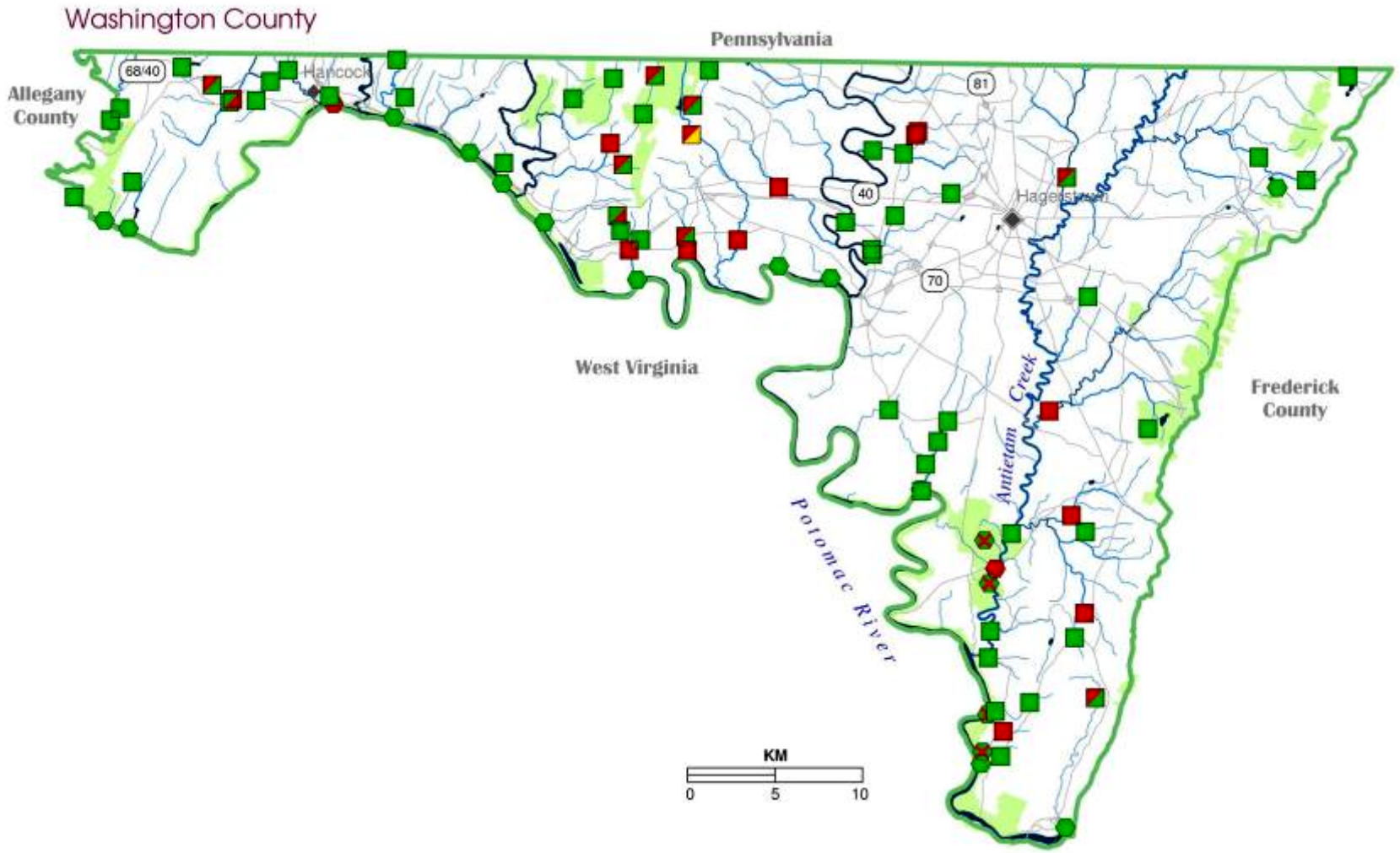


Figure 8-199. Map of sites with inadequate riparian buffers and buffer breaks for Washington County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

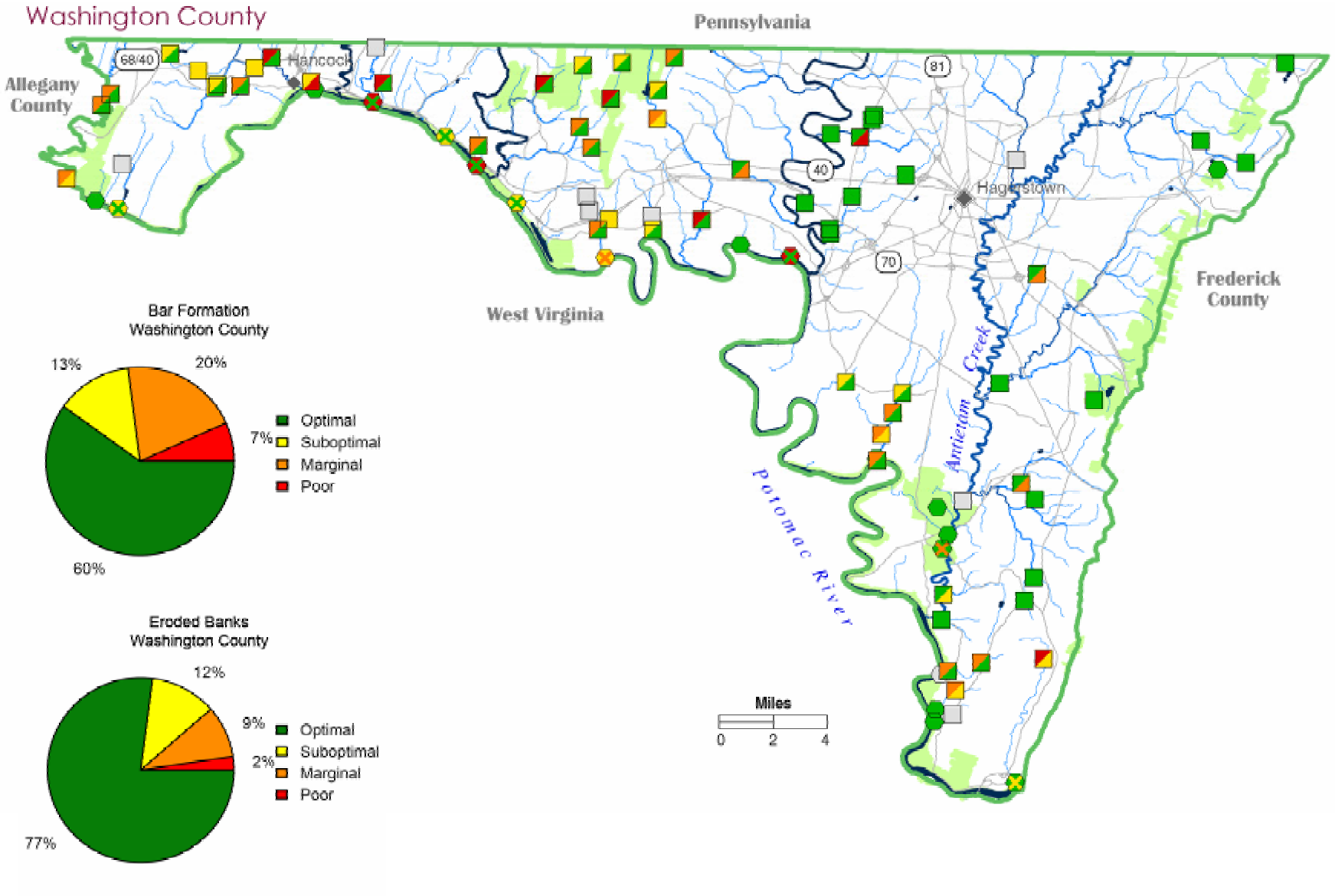


Figure 8-200. Pie charts and map of sites with eroded banks and instream bar formation for Washington County streams sampled by the MBSS during 2000-2004

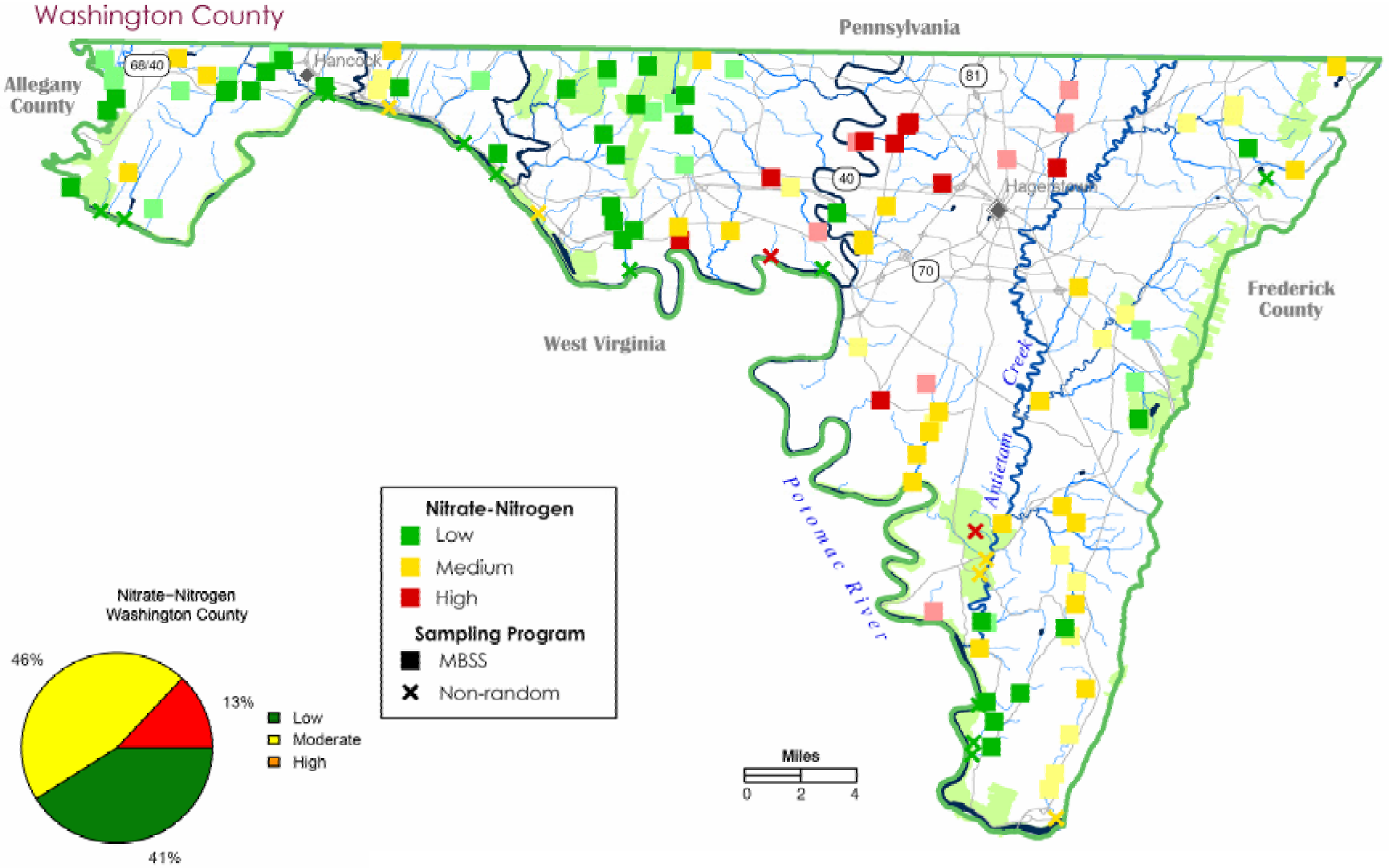


Figure 8-201. Pie chart and map of nitrate-nitrogen values (mg/l) for Washington County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0)

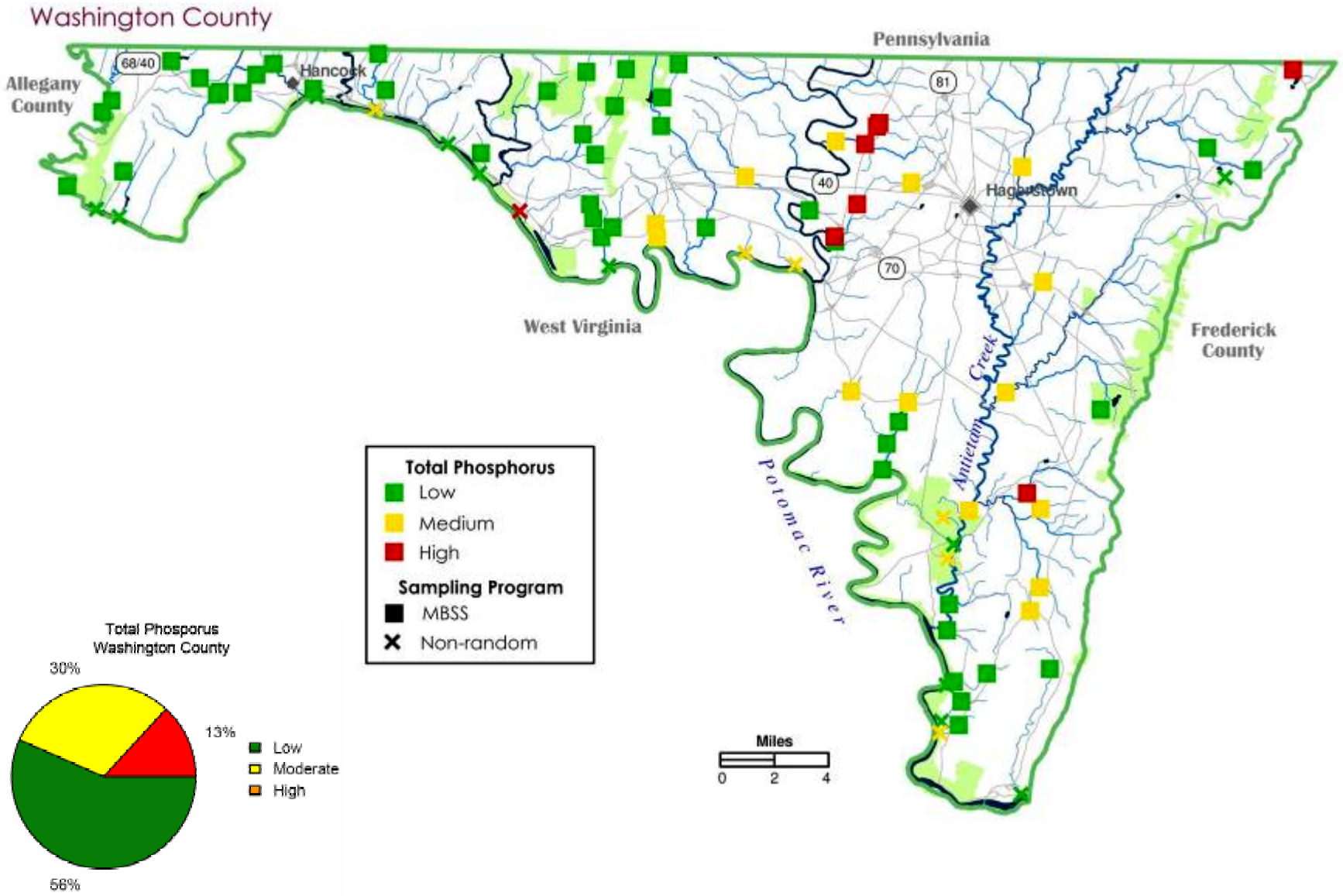


Figure 8-202. Pie chart and map of total phosphorus values (mg/l) for Washington County streams sampled by the MBSS during 2000-2004 (Low = < 0.025, Medium = 0.025 – 0.07, High = > 0.07)

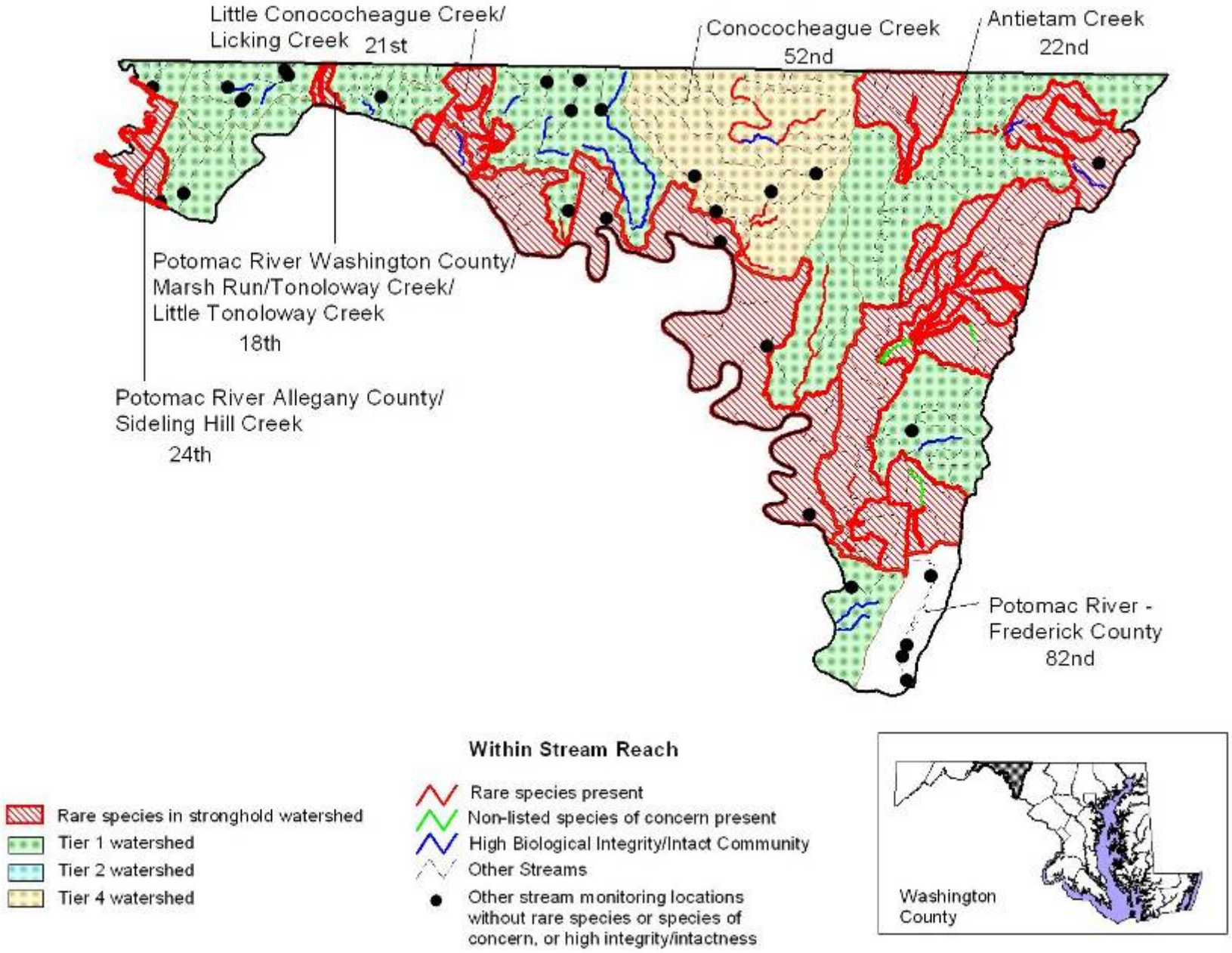


Figure 8-203. Aquatic Heritage Biodiversity Ranking map for Washington County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.